Title: Artus Creek Greenstone

Location: In pasture along the east side of Artus Creek.
NE¼, NW¼, NW¼, Sec. 29, T.29N., R.6E.
(Marathon 15 Minute Quadrangle, Marathon County)
(Get permission from Harold Theis (pronounced "Tice")
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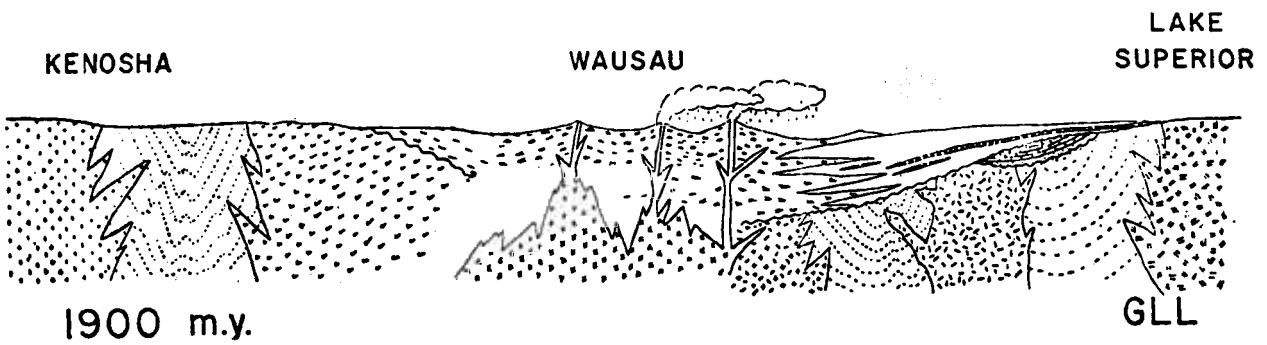
Description: At this stop there are numerous exposures of pillowed basaltic greenstone. Due to the irregular fracture pattern on the surface of the outcrop, the pillows are not very evident. However, they are well exposed on several small south-facing ledges farther from the road.

The pillows range in size from less than one foot to at least three feet in diameter. Pillows are widely used for top determination in mapping volcanic rocks. The accompanying photo, taken at this stop, shows the classical domal top and pointed bottom of the pillow. While the dip of the flows is readily determined from pillows, they do not show the strike. This must be determined by tracing a distinctive lithology (or pillowed unit). Where exposures are as limited as they are in Marathon County, it is extremely difficult to determine the strike of the basalts.

The greenstones here consist of sodic plagioclase, actinolite, epidote, chlorite, and minor carbonate and quartz. Epidote and actinolite are the dominant minerals in some samples. The term "greenstone" derives from the greenish color of the rock which is produced by the abundance of actinolite, epidote and chlorite. At the time of formation the selvages (rinds) around the pillows were probably a hydrated basaltic glass (palagonite); however, they are now dominantly quartz and epidote. The mineralogy of the rock is very different from that of fresh basalts, and is due to the low grade metamorphism the rocks have undergone.

Significance: Pillowed basalts are widely distributed in an east-west trending "belt" across northern Wisconsin. They are abundantly exposed near Pembine in Marinette County, and sporadically exposed to the west of there, including the Monico area in Oneida County. The Bouguer Anomaly Gravity Map of Wisconsin (Ervin & Hammer, 1974) suggests that these rather

Middle precambrian pillow lavas along Artus Creek. Pencil points at the top of the pillow.



MIDDLE PRECAMBRIAN

- GRANITIC ROCKS
- SEDIMENTARY ROCKS
- VOLCANIC ROCKS
- DOLOMITE, ETC.

EARLY PRECAMBRIAN

- GRANITIC ROCKS
- "GREENSTONE"

heavy rocks (a resulting gravity high) extend almost continuously from the Michigan border west beyond Ladysmith in Rusk County. Rhyolites are also present at most localities along this belt, indicating a long belt of volcanic activity. The widespread occurrence of pillows indicates a submarine origin for most of the volcanics.

Radioactive age dating on these rocks indicates that they were formed between 1900 m.y. and about 1825 m.y. ago (Van Schmus, Thurman and Peterman, 1975; Sims, 1976). Thus, they are approximately the same age as the iron-formation and graywacke on the Gogebic Range, and must, therefore, have formed as part of the same basin of deposition -- the Animikie Basin (LaBerge, 1977) (see diagram).

The volcanic rocks in Marathon County have been extensively intruded by granitic rocks and are separated by a large wedge-shaped mass of gneisses and amphibolites that appear to be much older. However, the volcanic rocks here are believed to be part of the Animikie Basin because they are of the same age, and were formed mainly in a subaqueous environment. At the succeeding stops, we will examine the possible relationships between these various rock sequences.

References:

Ervin, C. P. and Hammer, S., 1974, Bouguer Anomaly Gravity Map of Wisconsin; Wis. Geol. Nat. Hist. Survey.

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Van Schmus, W. R., Thurman, M. E. and Peterman, Z. E., 1975, Geology and Rb/Sr Chronology of Middle Precambrian Rocks in Eastern and Central Wisconsin: Geol. Soc. America Bull., Vol. 86, pp. 1255-1265.